

**NAME**

rmtxop - concatenate, add, transpose, scale, and convert matrices

**SYNOPSIS**

**rmtxop** [ -v ] [ -f[afdc] ] [ -t ] [ -s sf .. ] [ -c ce .. ] **m1** [ + ] ..

**DESCRIPTION**

*Rmtxop* loads and concatenates (multiplies) or adds together component matrix files given on the command line. Each file must have a header containing the following variables:

```
NROWS={number of rows}
NCOLS={number of columns}
NCOMP={number of components}
FORMAT={ascii|float|double|32-bit_rle_rgbe|32-bit_rle_zyxe}
```

The number of components indicates that each matrix element is actually composed of multiple elements, most commonly an RGB triple. This is essentially dividing the matrix into planes, where each component participates in a separate calculation. If an appropriate header is not present, it may be added with a call to *rcollate(1)*. A matrix may be read from the standard input using a hyphen by itself ('-') in the appropriate place on the command line.

Two special cases are handled for component matrices that are either XML files containing BTDF data, or Radiance picture files. In the first case, a BSDF library is used to load and interpret the transmission matrix. (XML files cannot be read from the standard input.) In the second case, the RGBE or XYZE values are loaded in a 3-component matrix where the number of columns match the X-dimension of the picture, and the number of rows match the Y-dimension. The picture must be in standard pixel ordering, and the first row is at the top with the first column on the left.

Before each file, the *-t* and *-s* or *-c* options may be used to modify the matrix. The *-t* option transposes the matrix, swapping rows and columns. The *-s* option applies the given scalar factor(s) to the elements of the matrix. If only one factor is provided, it will be used for all components. If multiple factors are given, their number must match the number of matrix components. Alternatively, the *-c* option may be used to "transform" the element values, possibly changing the number of components in the matrix. For example, a 3-component matrix can be transformed into a single-component matrix by using *-c* with three coefficients. A four-component matrix can be turned into a two-component matrix using 8 coefficients, where the first four coefficients will be used to compute the first new component, and the second four coefficients yield the second new component. Note that the number of coefficients must be an even multiple of the number of original components. The *-s* and *-c* options are mutually exclusive, insofar as they cannot be applied together to the same input matrix.

If present, the second and subsequent matrices on the command line are concatenated to the result unless separated by a plus ('+') symbol, in which case the elements are added together. The number of components in the new matrix after applying any *-c* transform must agree with the prior result. For concatenation (matrix multiplication), the number of columns in the prior result must equal the number of rows in the new matrix, and the result will have the number of rows of the previous and the number of columns of the new matrix. In the case of addition, the number of rows and columns of the prior result and the new matrix must match, and will not be changed by the operation.

Results are sent to the standard output. By default, the values will be written in the lowest resolution format among the inputs, but the *-f* option may be used to explicitly output components as ASCII (*-fa*), binary doubles (*-fd*), floats (*-ff*), or RGBE colors (*-fc*). In the latter case, the actual matrix dimensions are written in the resolution string rather than the header. Also, matrix results written as Radiance pictures must have either one or three components. In the one-component case, the output is written as grayscale.

The *-v* option turns on verbose reporting, which announces each operation.

**EXAMPLES**

To concatenate two matrix files with a BTDF between them and write the result as binary double:

```
rmtxop -fd view.vmx blinds.xml exterior.dmx > dcoef.dmx
```

To convert a BTDF matrix into a Radiance picture:

```
rmtxop -fc blinds.xml > blinds.hdr
```

To scale a matrix by 4 and add it to the transpose of another matrix:

```
rmtxop -s 4 left.mtx + -t right.mtx > result.mtx
```

To send the elements of a binary matrix to *rcalc(1)* for further processing:

```
rmtxop -fa orig.mtx | rcollate -ho -oc 1 | rcalc [operations]
```

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**SEE ALSO**

cnt(1), getinfo(1), histo(1), neaten(1), rcalc(1), rcollate(1), rcontrib(1), rfluxmtx(1), rlam(1), tabfunc(1), total(1)